

WHAT IS CLAIMED IS:

1. A vessel filter comprising a wire mounting section configured to engage a wall of a vessel, a wire filtering section configured to trap blood clots or other particles, and a tubular member positioned on the wire mounting section and having a first sharpened end for contacting the vessel wall to help retain the wire mounting section.
2. The vessel filter of claim 1, wherein the first sharpened end of the tubular member is formed by a beveled edge.
3. The vessel filter of claim 1, wherein the first sharpened end of the tubular member is formed by a ground edge.
4. The vessel filter of claim 3, wherein the tubular member has a second sharpened ground edge opposite the ground edge at the first end.
5. The vessel filter of claim 2, wherein the tubular member has a second sharpened bevelled edge opposite the bevelled edge of the first end.
6. The vessel filter of claim 1, wherein the wire mounting section and the filtering section are movable from a collapsed configuration for insertion into a vessel to an expanded configuration, the tubular member being substantially parallel to a longitudinal axis of the wire mounting section in the collapsed configuration.
7. In a vessel filter having a mounting section and a filtering section, the improvement comprising at least two elongated vessel engaging members mounted on the mounting section, each vessel engaging member having first and second opposed edges, the edges configured to engage different portions of the vessel wall.
8. The vessel filter of claim 7, wherein the elongated member is a plastic tube and the first and second edges are ground edges to form sharpened edges.

9. The vessel filter of claim 7, wherein the elongated member is a plastic tube and the first and second edges are beveled to form sharpened edges.
10. A vessel filter comprising a first wire mounting section having a plurality of wire loops and expandable to a first dimension, a second wire filtering section having a plurality of wire loops and expandable to a second dimension smaller than the first dimension, an intermediate wire section between the mounting and filtering sections, and a retaining sleeve having a lumen to receive a portion of the intermediate wire section.
11. The vessel filter of claim 10, wherein the first and second wire sections are composed of a single wire.
12. The vessel filter of claim 10, wherein the first wire section is composed of at least two discrete wires and the second wire section is composed of the at least two discrete wires, the retaining sleeve retaining the two wires.
13. The vessel filter of claim 10, further comprising a crimping sleeve on a distal portion of the first wire mounting section and a retaining sleeve on a proximal portion of the second wire filter section.
14. The vessel filter of claim 10, wherein the first and second wire sections are composed of first, second and third discrete wires, the retaining sleeve retaining the first, second and third wires.
15. A vessel filter comprising a proximal portion, a distal portion, a first wire extending from the proximal portion to the distal portion and forming a series of loops extending substantially in a first direction, a second wire extending from the proximal to the distal portion and forming a series of loops extending substantially in a second direction different than the first direction.

16. The vessel filter of claim 15, wherein the second direction is substantially opposite the first direction.
17. The vessel filter of claim 15, wherein the first and second series of loops are non-contiguous.
18. The vessel filter of claim 15, further comprising a third wire forming a series of loops extending in substantially a third direction, the third direction being different than the first and second directions.
19. The vessel filter of claim 18, wherein the series of loops of the first, second and third wires are about 120 degrees out of phase.
20. A surgical apparatus comprising a vessel filter movable from a collapsed configuration for delivery to a vessel and an expanded configuration for mounting the filter within the vessel, the collapsed configuration having a first dimension and the expanded configuration having a second dimension larger than the first dimension, wherein the filter includes a plurality of wire sections and a sleeve containing the wire sections in adjacent relationship, wherein in the collapsed configuration the first dimension of the filter does not exceed an outer diameter of the sleeve, thereby providing a reduced configuration for placement inside a delivery sheath for insertion into the vessel.
21. The apparatus of claim 20, wherein the plurality of wire sections are formed as first and second separate wires.
22. The apparatus of claim 20, wherein the plurality of wire sections are formed as first, second, and third separate wires.
23. The apparatus of claim 20, further comprising a filter securing member engageable with the vessel wall, the securing member being oriented substantially

parallel to the longitudinal axis of the filter in the collapsed configuration and having an outer diameter, wherein the sum of the outer diameter of the securing member and an outer diameter of one of the wire sections defines a third dimension, the third dimension defining the largest diameter of the filter in the collapsed configuration.

24. The apparatus of claim 20, further comprising a filter securing member engageable with the vessel wall, the securing member being oriented substantially parallel to the longitudinal axis of the filter in the collapsed configuration and having an outer diameter, wherein the sum of the outer diameter of the securing member and an outer diameter of one of the wire sections defines a third dimension, wherein the third dimension does not exceed the outer diameter of the sleeve.

25. The apparatus of claim 20, further comprising a filter securing member engageable with the vessel wall, the securing member being oriented substantially parallel to the longitudinal axis of the filter in the collapsed configuration and having an outer diameter, wherein a third dimension defined by an outer diameter of the securing member and the two of the wire sections adjacent the securing member defines the largest diameter of the filter in the collapsed configuration.

26. The apparatus of claim 20, further comprising a filter securing member engageable with the vessel wall, the securing member being oriented substantially parallel to the longitudinal axis of the filter in the collapsed configuration and having an outer diameter, wherein the outer diameter of the securing member and two of the wire sections adjacent the securing member defines a third dimension, wherein the third dimension does not exceed the outer diameter of the sleeve.

27. The apparatus of claim 20, wherein the plurality of wire sections are composed of shape memory material.

28. A vessel filter comprising:

a first, second and third wire sections each having a first diameter, an anchoring member extending from the first wire section and having a second outer diameter, and a sleeve retaining the first, second and third wire sections in adjacent relationship and having a third diameter, wherein a transverse dimension of the anchoring member and the first and second wire sections is less than or equal to the outer diameter of the sleeve to maintain a reduced configuration for insertion into a vessel.

29. The vessel filter of claim 28, wherein the vessel filter is movable from a collapsed configuration for delivery to an expanded configuration for deployment in the vessel, and a dimension of the filter at one end in the expanded configuration is greater than a dimension of the filter at the other end in the expanded configuration.

30. A vessel filter comprising a first plurality of loops and a second plurality of loops, the first plurality of loops extending alternately in a first direction and a second direction with the center of the radii of each loop in substantial alignment along a first imaginary line substantially parallel to a longitudinal axis of the filter, and the second plurality of loops extending alternately in a first direction and in a second direction with the center of radii of each loop lying substantially along a second imaginary line substantially parallel to the longitudinal axis of the filter, wherein the first and second lines lie in substantially the same transverse plane.

31. The vessel filter of claim 30, wherein the plurality of loops are formed by first and second wires which do not intersect.